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Art Engineering and Kinetic Art

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ABSTRACT

Performing an art, either by painting or by sculpturing, requires to be interdisciplinary. When an artist creates his/her work of art, the process he/she realizes is supported by different engineering disciplines. Therefore, especially modern artists need to understand engineering science and this results in transforming artists into engineers. Opportunities provided by technology and science enable artists to expand his/her vision and to improve his/her works. Especially kinetic art has become an approach that combines art with engineering. Kinetic art, which is nourished with varied disciplines, is an excellent example to prove that art is interdisciplinary and to show the relationship between artist/art and engineering.

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1.0 Introduction

Engineering of art or engineer artisan concepts is a true concept in terms of that science and art are fed from each other and parallel act in some cases. Artisan also gets the benefit from so many disciplines when carrying out his/her creation. Starting from Jan van Eyck and following craftsmen getting benefit from chemistry engineering by using different mixtures with pigments and various oils at formation of

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oil paint that has a history for approximately six centuries, Leonardo Da Vinci getting benefit from different engineering fields such as mathematic and mechanic as a characteristic of Renaissance ensamples the engineering concept of art. Along with development of art and technology have diversified the technique with the material that artisan is able to use and get benefit from. While different engineering branches have occurred, new concepts have also entered within the literature along with it. The word of kinetic (Kinesis) that was previously only used to define the events related to motion at physics and chemistry branches, it has passed to within the field of art after 1954 and took its place within the word of art after Kinetic Art Chronology was published in 1960. Kinetic Art is may the art branch in which the works occurred with the concept of ''engineering of art" is mostly come across.

Opportunities provided by technology and science expands not only the material repertoire of an artist but also other disciplines with which art works cooperatively. In an age of constantly developing knowledge and technique, the solution generating process of an artist during performing his/her art make him/her become an engineer and open himself/herself to innovations. In this context, kinetic art is the most stunning approach in which an artist behaves like an engineer.

2.0 Methodology

When establishing this research, "engineering of art" and "kinetic art" terms is evaluated separately and the relationship between these terms is explained. During the evaluation of the research process, related literature is reviewed, related articles and journals are cited. Gathered data and observed statistics are organized to support the idea generated for "engineering of art" and "kinetic art".

The term "Engineering" is used to help artist become more aware of technique and science in relation to developing science and technology. The terms "art" and "engineering are gathered together as a necessity for scientific knowledge and technique of an artist. In this context, kinetic art is considered as the best example and it is reviewed as an approach that explains engineering in the art.

3.0 Relation of Science- Technology and Art

Since primitive era, human have been in an effort of adjusting with the nature and even overcoming it. The need of knowing and learning the fears and knowing about his/her surrounding put him/her into a struggle with the nature and continued this as prevalence to the nature and overcoming efforts. In fact science and technology is exploring the nature desire of the human as well as facing with the name. We can call the technology as human capability in terms of being able to use equipment. A simple stone of the first human has started with his/her giving shape for being able to use it more functionally. Human has developed the tools everyday that they used for being dominant in the nature and laid all the foundations of thought, science and culture's all elements during using tool process.

Science and art, both of them has a magnificent curiosity and exploration excitement across the nature and its function. They have a common share at transforming current and possible statuses into itself by observing rules of this function and solving it.

The art has been first started to be mentioned with the information along with the Renaissance. In this era, the theories in terms of science and art being not in accordance with each other were debunked and the art was transformed into an important tool in terms of the art directing the cultural horizon. The art has the different bound with science and technology in terms of method, but same bond in terms of the things that they serve and their purposes.

Read puts forward that science and art is not separate from each other and only its methods are separate from each other. According to him; "both science and art deal with the same reality but the art describes and demonstrates the reality and science explains it" (San, 1977, pp.5). While art tries to tell relations with the nature and its disciplines with aesthetic signs, It uses the discernments in telling these. Science proves these by taking the data at its discipline as basis. The common aim of the relation

is to being able to reach the reality. "The difference and the important factor distinguishing the scientific information from art information is that statements of the scientific information whose accuracy value is high, whose accuracy has been proved for the being time and that can be mentioned as true or wrong at some extents on specific conditions" (Sonmez, 2011, pp.22).

Development of the technique has been started with human gaining the capability of human senses and along with using his/her organs like hands. The same developments are valid conditions such as the art coming into action. Development of the art, science and technology and interact of these with each other have continued with the formation of these three concepts.

While technology and science offer new points of view with opportunities of the era at creation and production action of the artisan, they become material of the creation. "Techne" being the word root of technical and technological words in Old Greece means art and become a common expression used for both of scientific ad art practices" (Eskridge, 2010, pp.1). The artisan has to get the benefit from the technology from the first times. At the second half of XIV century, Jan van Eyck exploring "white Bruges varnish" (turpentine) mixture with linseed oil with experimental study to be able to gain a permanent paint and by adding paint pigments to this mixture, gaining a paint whose thickness and finesses can be experienced and that dries at appropriate slowness in accordance with retouch has been an important stage in terms of on canvas painting. Eyck got benefit from information and experiment while constituting this mixture. In other words he behaved as parallel to target of chemist.

Art and technology relation also has been subjected to change with Renaissance and then its being taken under the effect of industry revolution. Especially in this era, the art got benefit from the science and at the same time was given to the artisans within the same discipline. "The most prominent art engineer of Renaissance was Leonardo Da Vinci and big artist Andrea del Verrocchio who was his teacher as an apprentice said him to learn philosophy, mathematics and anatomy as well as Latin Greek classics" (Yıldırım, 2008, pp.82). This attitude is resulted from the nature of Renaissance. We can say that Leonardo is the most known "artisan engineer". There is no any other artisan who is able to feed science and art with each other.

So many artisan and scientists such as Johann Wolfgang Von Goethe who lived before so many centuries and accepted "the art as inference of science" and Leonardo Da Vinci who explored technical and scientific rules of visual arts " have been a consensus concerning to fully dependent structures of art and science to each other and put the holistic structures of two disciplines as practical and theory." (Jacob,1973, pp.40).

4.0 The effect of technology on art and disciplinary and Engineering of art

Today the things brought by Information Era have entered into every field of the life. Hyper technologic information of the era, the things knows about scientific theories, space, and universe being subjected to change and new things being added to the known ones have added a new view of point to the art and along with the ones expected from artisan changed artisan view of point to the art. The change appearing with the addition of technological tools and equipments into life forced to addition of new media and technology to material and application of artisan.

The art of 21 Century has entered into interaction with the technologies such as physic, chemistry, optics and electronic and art creations such as internet art, voice and light integrations, kinetic and robotic sculpture have become to be used artisans. Technology has changed the method and thinking of the artisan. It is not impossible to say that technologic developments have directly and deeply affected this artwork at previous eras.

The opportunities provided by technology and sciences in this era loads the information and knowledge that is to be known by an engineer at the production stage on the artisan. The artisan has started to produce arts that he/she is not able to produce via any other tools by using computer technologies.

He/she has to get support from so many computer software and in some cases he/she has to come across so many problems that can be faced by a software engineer.

"The approaches occurring in the concept of conventional art has showed that art disciplines interlocks within each other, the important one is aesthetic sensitiveness and rather than what kind of a material is used on art objects, the material that was used at the art gained importance" (Kılıç,2005, pp.66). The opportunities of technique and material provided to the artisan and its being given more importance on the way of thinking have created disciplinary diversification and getting benefit from positive sciences such as physics and chemistry and technology are at highest levels of the list.

> "When mentioning about interdisciplinary information, not mentioning about Marcel Duchamp is almost impossible. Almost all activities of artisan occurred under the effect of different acquisitions of all art activities and in some ways have affected all art understandings coming after itself. When Duchmap and his art is within the subject, a sharp mathematic intelligence and reflection of mathematic on the art come across. As well as that we should also take activities of only thought man into consideration. The transformation that painting art has been subjected to after Duchamp and Dada makes this new structural change as a product of disciplinary information as an indispensible art object. The definition of a man of world and artisan requiring an observer of the world that come into action with Leonardo comes at the same point with Century art. The artisan is not able to isolate himself/herself from disciplinary information by neither what he/she wants to mention about nor his/her expression type" (Kara,2003, pp.108-109).

In the world starting to globalized at the beginning of 21 century, so many rooted developments from political and economic level to cultural requests, from excellent diversification at communication and speed to art have been occurred. Each concept that was defined within its uniqueness has been transforming into a heterogeneous culture component as one part of "Culture Industry" directed to dominance of multinational companies. This process starting with 1950s drew the masses into the network of information and positively affected accessibility of the information.

This process forced to changing the definition of art and artisan and the conditions affecting these definitions. Today's artisan nearly transforms into an engineer in this era when accessibility to technique and information is at the upper levels in this data and information era. An engineer has to act like a technician. Today's artisan has to act like an expert who is able to design something rather than produce something and gets benefit from so many different disciplines within this disciplinary in so many cases. Far beyond making a picture or a sculpture, the art forms into shape as abstract or intangible reflection of inquiries by solving the art problems uniquely with a high thinking and technique and by perceiving cultural and global concepts and inquiring these concepts.

Walter Benjamin advocated that 'while examining the artwork in the ear when it is possible to multiply it thanks to technology benefits, pointing a new esthetics derived from photography and cinema, the art work may lose some of its unique characteristics and by this way a transformation and change may occur from these existence conditions. It seems that this prophecy of Benjamin has come true mostly at high level (Benjamin, 1994)'. Using technical opportunities of so many different fields in terms of today's artisan and getting benefit from engineering this discipline increased information and technical capacity of artisan to the highest level and swept away sharp borders of disciplines for artisan.

Disciplinary relation and interaction can be seen at its own fields of art and art fields and science branches. One of the most important reasons why today's art disciplines moves within the borders of each other and that underlines producing projects is that rather than how the artisan mention rather than what artisan mentions gains importance in the art understanding of our era. Insignificance of the used material and freedom devoted to use of all kinds of materials necessary in providing the expression other than the common materials like paint, stone, clay, etc an importance of disciplinary

nourishment as a requirement of that were come up. Today art: "as well as enters into a indispensible interest such as visual arts (picture, three dimensional art works, photograph, video, graphic, virtual environment icons) literary, drama, dance, music, films and shows a tendency towards being a relationship with politics and economy sciences, community science and philosophy…" (Madra, 2002).

5.0 Kinetic art

The kinetic that science branches such as physics and chemistry use to define the motion movements; visually or as a real motion provides different expressions of the art thanks to various tools. Kinetic art was firstly put forward by Constructivists. Constructivism and Dadaism had been the source of this movement. Pevsner and Gabo brothers advocate this art concept as like following in their manifestations: "we should relieve us from a thousand year illusion of art that come from Egypt and the illusion of that it can be only formed by static rhythms. We notify that kinetic rhythms are main elements of art as main type of sensibility of our era". The first kinetic sculpture was "kinetic sculpture" done by N. Gabo in 1920 within the direction of this understanding: "Increasing and Standing Wave" (Kınay, 1993).

> "The word of Kinetic (Kinesis) previously used to only define the events relevant to motion in the branches of physics and chemistry was began to be used in the field of art after 1954 and it took its place within the art language after a Kinetic Art chronology was published as 1960… As a result of the studies focused on the field of Optical Art after 1960, not only optical arts but also three dimensional studies that had a real motion have been carried out (Germaner, 1997, pp.33).

There were too fewer examples for kinetic art before 1930. Balla and Fortunata Depero (1892-1960) among "Futurism" movement artisans gave some examples for three dimensional movable objects and they used these in mechanical theater. The most early kinetic art example was Duchamp's Bicycle Tire (1913) artwork. Disks Row of Delaunay (1912-13) I Kinetic Construction No-1 of Gabo (1920) and III. Integrational Monument Project of Tatlin (1919) are kinetic models.

Kinetic Art became one of the common types of expression used in USA and Europe in 1960s. While Mary Martin (1907-1969) gained the motion at arts works shaped with mathematic rules such as Golden Ratio via natural light in England, her husdand Martin got benefit from moving objects. The art works of Alexander Calder (1898-1976) that he developed as being able to operated manually or via an engine and that was called as "mobiles" by Duchamp are the most significant kinetic art examples of this era.

Today's' Kinetic Art has artisan models that use all opportunities of technology and science. Theo Jansen (1948) carrying out designs like machine engineer and at the same time educated in the field of physics at university times was a remarkable artisan engineer. His huge machines that called as "My Animals" and operated with wind power are one of the best examples of kinetic studies. Another person who uses wind power as an energy source was Anthony Howe. Kinetic studies that starts to getting into motion and done from stainless steel provides a visual delight by providing an optical illusion.

The artisans who best get benefit from technology and computer may be Jöachim Sauter. Forming one kind of aluminum balls hang down the ceiling by a fish line and moving into synchronization with a separate engine requires an excellent technology and computer software.

6.0 Conclusion

Being in a multidisciplinary structure, artist and art need to benefit from the opportunities provided by science and technology as much as possible. This need transforms the artist into a technician or an engineer that makes designs during his/her creation phase. An artist is now obliged to comply with a

great deal of capabilities that is brought with material repertoire and unrestricted techniques of the age. The constantly developing structure of technology brings new additions to the world day by day. The way an art nourishes itself with other disciplines results in offering diversity within that sort of art. Especially developments in mechanics and technology shows themselves as the best example of this continuous process.

Solving a problem and generating a solution during a period of creating art lets an artist benefit from the opportunities of his/her age. Therefore, "kinetic art" is the optimum meeting point of art with technique and technology. Kinetic art is the perfect art discipline in which "artist engineer" and "engineering of art" terms is used appropriately. When we examine the examples of kinetic art, we will notably realize the multidisciplinary structure of art.

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